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| Math CAMPPP 2011: Algebraic Thinking Breakout #1  What’s the Focus? Responding to Students in the Moment | | Breakout 9-12 |
| MO 35  AC 45  C/D 10  Total: 90 | Math Learning Goals   * Get to know each other * **Responding**: Identify examples of generalization and justification in student work * **Important Math**: Explore concrete representations of functions * **Important Math:** Explore the connection between patterning and algebraic thinking | Materials   * 8X11paper(colours) * 11 x 14 paper * BLM1.1,one/group * Norms tent cards * Chart paper * Sticker dots * Masking Tape * Crayons / markers * Linking cubes, Square tiles * Brookhart Feedback handout |
|  | Whole Group → Individual Self-Guided Activities  1. Bar Chart: On the way in, participants put stickers on chart paper based on course experience and interest (See sample BLM 1.2) will we have the sample posted?  2. Individual Glyphs: Participants create Glyphs (characters) based on answers to questions (BLM 1.1) will we have our glyphs already posted??  3. Facilitators introduce themselves by sharing their glyphs, and informal table groups do the same. Post glyphs near bar graph on wall for future reference.  Allow about 15 minutes.  Use bar graph and glyphs indicating experience and interests of the group, to inform future activities and grouping decisions.  Small Group 🡪 Individual Reflection, Sharing, Summarizing  Individually, participants reflect on the Question: *Why did you come to Math Camp*?  Share within groups, then illustrate your groups’ responses on chart paper.  Circulate and listen to group discussions. Observe group dynamics and note individual voices and body language.  Small groups share with the whole group, and post their chart paper.  Allow about 20 minutes. | Use:  🡪 Blue stickers: Courses you’ve taught recently or know well  🡪 Red Stickers: One or two courses you would like to focus on at camp  Norms are being discussed/established in Plenary sessions. Place tent cards on tables  Encourage groups to look for similarities / themes in the responses, not just make a list |
| Minds On… |
| afl  afl |
|  | **Pairs 🡪 Discussion**  Regroup participants using Glyphs (pairs)  Participants use student work samples from Cube Sticker problem (BLM 1.3) to identify and discuss examples of algebraic thinking based on “Genereralization Strategies and Justification Framework” (from Plenary)  Pairs get together with another pair and share observations. Allow about 30 minutes.  Circulate and observe group discussions, common themes, challenges, insights relative to learning goal # 2  **Small Group🡪 Model Building**  Build a concrete model of any function using the materials provided. (Algebra tiles, square tiles, cubalinks, sticky notes, diagrams etc.) About 15 minutes.  Possible scaffolding questions (responding in the moment)  “ What is the output when x is 25? How can you tell from your model?”  “Did you recall any functions in the Plenary?”  “Does your model represent a generalization or a pattern?”  Observe participants. Anticipate confusion between building a pattern and building a function. Listen for link between term number and “x” – the independent variable.  Some sort of Debrief is needed here – no time for stay and stray | - Could group randomly – to encourage getting to know new people  - Use plenary slides for reference (Generalization, Justification)  di Question is open, so participants can build any function any way. Differentiated by readiness.  - If time permits, could implement a “stay and stray” where participants circulate to observe other models. |
| Action! |
| afl  di  afl  afl |
|  | Individual 🡪 Reflection and Feedback  Participants construct either a “Perspective Passport” or a “Math Map” to keep track of their personal reflections and learning throughout camp.  Participants reflect individually on their learning, and record their thinking.  Participants add sticky notes to glyphs to indicate ideas they would like to follow up on.  Use sticky notes to inform instructional decisions for follow-up sessions | diOffer participants a choice for reflection. Differentiated based on learning preferences.  - Possible stems:  “I’m wondering about….” ”I’m confused about…..”  “I would like to learn more about….” |
| Consolidate Debrief |
| di  afl |
|  | Home Activity or Further Classroom Consolidation  Read the Brookhart article on Feedback in preparation for tomorrow. | Article from “How to Give Effective Feedback to Your Students”, p. 1-9 |

BLM 1.1 Instructions for Personal Glyph

Use the materials provided (paper, crayons) to create a character that tells about you.

1. Choose a coloured piece of paper to indicate your geographical location:

White: Northern Ontario

Blue: Toronto Area

Green: Southern Ontario

Yellow: Western Ontario

Pink: Eastern Ontario

1. Draw an oval for the head. Center the oval in the page. The area of the oval should be approximately half of the area on the page.
2. Draw hair on the head – one hair per year of teaching experience (i.e. 10 years 🡪 10 hairs)
3. Add eyes. If you are a teacher, add two eyes. If you are a coach or consultant, add only one eye. If you are an administrator, add three eyes.
4. If you are a department head, or have ever been a department head, add a nose.
5. Add a mouth and eyebrows to create a facial expression that indicates how you are feeling right now.

7. Add a feature to illustrate your preferred learning style(s).

Visual: Add glasses

Auditory: Add ears

Kinesthetic: Add a small body attached to your head

8. Write your first name in big letters on the top of your drawing.

BLM 1.2 Sample Bar Chart

MAT1L

MFM1P

MPM1D

Number of Participants

Summary of Participants’ Experience and Interest by Course

*Experience*

*Interest*

*Experience and Interest*

*🡨 More courses 🡪*

BLM 1.3: Cube Sticker Problem

A company makes coloured rods by joining cubes in a row and using a sticker machine to put “smiley” stickers on the rods. The machine places exactly 1 sticker on each exposed face of each cube. Every exposed face of each cube has to have a sticker. This rod of length 2 (2 cubes) would need 10 stickers.

How many stickers would you need for:

A rod of 1 cube

A rod of 2 cubes

A rod of 3 cubes

A rod of 4 cubes

A rod of 10 cubes

How many stickers would you need for a rod of 20 cubes?

How many stickers would you need for a rod of 56 cubes?

What’s the rule?